INCH-POUND

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SUPERSEDING
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PERFORMANCE SPECIFICATION SHEET

ELECTRON TUBE, THYRATRON
TYPE 7782

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the electron tube described herein shall consist of this document and the latest issue of MIL-PRF-1.

DESCRIPTION: Triode, hydrogen, ceramic-metal.
See figure 1.
Mounting position: Any.
Weight: 4.8 ounces (136 grams) nominal.

ABSOLUTE RATINGS:

Parameter:	Ef	epy	epx	Ebb	egy	egx	ib	Ecc	Ip
Unit:	V ac	kv	kv	kV dc	v	v	a	V dc	A
Maximum:	6.8	12.0 1/	12.0 2/	----	600 3/	200	350	150	5.0
Minimum:	5.8	----	5% epy	0.3	175	----	----	----	----
Test Conditions:	6.3	12.0	----	----	150	----	----	----	----

ABSOLUTE RATINGS:

Parameter:	Ib	prr	Eres	Pb	tk	dik/dt	TA	tj	Cooling
Unit:	A dc	----	V ac	----	sec	a/µs	°C	µs 7/	----
Maximum:	0.2	5/	6.8	4.0×10^{9} 5/	----	2,000	+150	0.005	6/
Minimum:	----	----	5.8	----	180	----	-55	----	----
Test Conditions:	----	1,500	6.3	----	180	----	----	----	----

See footnotes at end of table I.

GENERAL:

Qualification - Required. 4/

TABLE I. Testing and inspection.

Inspection	Method	Conditions	Acceptance Level 16/	Symbol	Limits Min	Limits Max	Unit
Conformance inspection, part 1							
Heater current (cathode)	3241		0.65	If	3.5	7.0	A ac
Heater current (reservoir)	3241		0.65	Ires	1.0	2.5	A ac
Instantaneous starting 9/ 10/	3267	epy = 12 kv (min); Ef = Eres = 6.8 V ac	0.65	----	----	----	----
DC anode voltage for conduction 9/ 11/	3247	Ef = Eres = 5.8 V ac	0.65	Ebb	----	300	V dc
Operation (1) 9/ 12/	3246	epy = 14.0 kv; Ef = Eres = 5.8 V ac	0.65	egy	----	150	v
Operation (1A)	3246	Operation (1); Ef = Eres = 6.8 V ac	0.65	egy	----	150	v
Pulse emission	3251	ik = 350 a; tp = 5.0 µs ± 10 percent; prr = 60 ± 10 percent tr = 0.5 µs (max); specified time interval = 2.5 µs	0.65	egk	----	200	v
Conformance inspection, part 2							
Anode delay time	3256	Operation (1); t = 120 seconds	----	tad	----	0.5	µs
Anode delay time drift 13/	3256	Anode delay time	----	Δtad	----	0.10	µs
Time jitter 14/	3261	Operation (1), except epy = 3 kv	----	tj	----	0.005	µs
Conformance inspection, part 3							
Life test: 9/	----	Group C; t = 96 hours “on” and “1” hour “off”; t = 500 hours	---	---	---	---	---
Life-test end points	---						
Operation (1) and (1A)	3246		----	egy	----	150	v
DC anode voltage for conduction	3247	egy = 150 v	----	Ebb	----	1,000	v
Time jitter	3261	egy = 150 v	----	tj	----	0.005	µs
Sweep - frequency vibration 4/ 8/	1031	0 to 2,000 Hz	----	----	----	----	----
Shock 4/	1041	100 G; no voltages applied	----	----	----	----	----

See footnotes at end of table.

TABLE I. Testing and inspection - Continued.

Inspection	Method	Conditions	Symbol	Limits		Unit
				Min	Max	
Conformance inspection, part 3 - Continued						
Sweep-frequency vibration and shock end points:	---					
Operation (1)	3246		egy	----	150	v
DC anode voltage for conduction	3247		Ebb	----	300	V dc
Time jitter	3261		tj	----	0.005	µs
Operation at elevated ambient temperature 4/ 9/ 15/	3246	TA = 150°C; t = 5 hours	egy	----	150	v

1/ Instantaneous starting is permissible. The maximum permissible instantaneously applied epy is 8.0 kv and shall not be attained in less than 0.04 seconds. The epy may then be raised to full rating.

2/ In pulse operation, the peak inverse voltage, exclusive of a spike of 0.05 µs maximum duration, shall not exceed 2.0 kv during the first 25 µs following the anode pulse.

3/ The driver pulse, measured at tube socket with thyratron grid disconnected shall have the following characteristics: 175 volts minimum; 600 volts maximum; tr = 0.35 µs maximum; tp = 2.0 µs minimum, impedance of drive circuit Zg = 1,500-ohms maximum. At -55°C, 250 V minimum shall be required.

4/ This test shall be performed during the initial production and once each succeeding 12-calendar months in which there is production. An accept on zero defect sampling plan shall be used, with sample of three tubes with acceptance on zero defects. In the event of failure, the test will be made as a part of conformance inspection, part 2, with an acceptance level of 6.5 (see 16/). The regular "12-calendar month" sampling plan shall be reinstated after three consecutive samples have been accepted.

5/ The tube is capable of operation of over 50,000 pps within the limitations of the Pb and Ib current ratings. With a saturable reactor, Pb equal to 4×10^9 is permissible for certain applications.

6/ It may be desirable to employ forced-air cooling under conditions of high Pb number operations. A cooling airblast of 5 cfm may be directed into the anode cup.

7/ Appreciably less jitter than 0.005 µs can be realized if the anode voltage is 3 kv or more, grid drive amplitude is near the maximum and grid drive impedance is near minimum.

8/ There shall be no pronounced resonance in the range from 0 to 2,000 Hz.

9/ The circuit constants shall be chosen under resonant charging conditions so that: epy = 14 kv; ib = 150 a minimum; dik/dt = 1,500 a/µs minimum; tp = 1.0 + 10 percent; prr = 1,000 minimum; Rg1 = 30,000 ohms. Grid pulse characteristics shall be: tr = 0.35 µs minimum; tp = 2.0 µs maximum, and Zg = 500-ohms minimum.

10/ The tube shall operate satisfactorily on push-button starting within three attempts when the anode voltage (epy) is applied to the TUT in such a manner as to rise from 0 to 8 kv minimum within 0.03 seconds. (The filter in the rectifier shall be designed so that the epy reaches at least 4 kv within 0.015 second.)

11/ This test shall be conducted within 60 seconds of the operation (1) test.

12/ The tube shall operate continuously for 10 minutes.

TABLE I. Testing and inspection - Continued.

13/ This test shall be performed simultaneously with the operation (1) test. An anode delay time measurement shall be made at the end of 2 and 10 minutes of the operation (1) test. The change in anode delay time (with respect to the 2-minute reading) shall not exceed the specified value at any time during this test.

14/ The tube shall be tested by applying a peak forward anode voltage not to exceed that specified in the test conditions for the time jitter test immediately after the cathode warmup period (tk). The variation in firing time (tj) shall not be greater than the amount specified after 60 seconds of operation.

15/ This test shall be conducted for a total of 5 consecutive hours with no more than 3 kickouts and with no evidence of detrimental anode heating. The tube shall be started with Eres 107.5 percent V ac and operate at this value for 4 hours. At the start of the fifth hour, and while the tube is still operating, the filament voltage shall be lowered to Eres = 92.5 percent V ac and remain there for the final hour of operation.

16/ This specification sheet uses accept on zero defect sampling plan in accordance with MIL-PRF-1, table III.

Ltr	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
Conformance inspection, part 2				
A	1.870	1.880	47.50	47.75
B	1.365	1.385	34.67	35.18
C	1.875	2.000	47.62	50.80
E	1.421	1.453	36.09	36.91
F	0.156	0.280	3.96	7.11
G	----	1.000	----	25.40
Reference dimensions				
D	0.030		0.76	
H	1.656		42.06	
J	6.000		152.40	
K	0.203		5.16	
L	0.150		3.81	

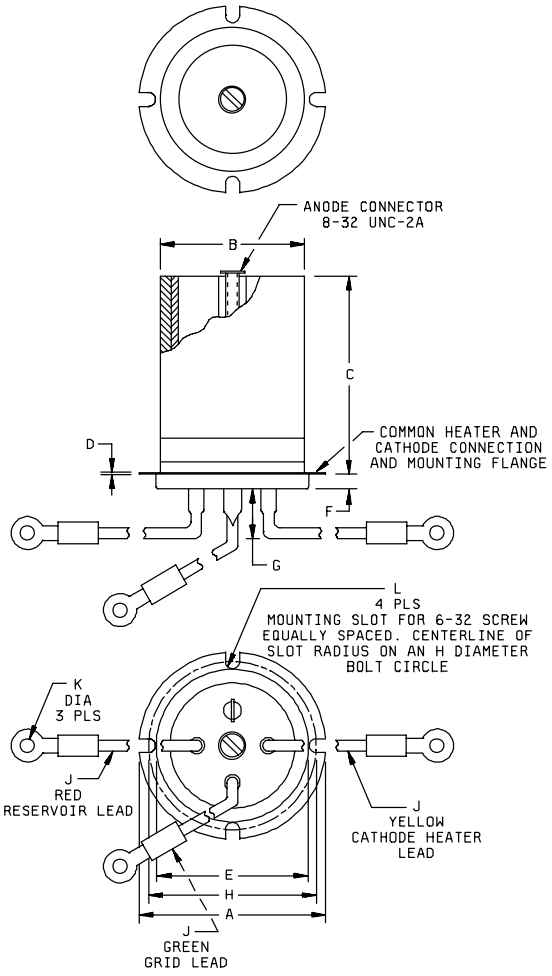

FIGURE 1. Outline drawing of electron tube type 7782.

Custodians:
Navy - EC
DLA - CC

Review activities:
Navy - CG, MC

Preparing activity:
DLA - CC

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